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ABSTRACT

This guide to educational services for individuals with traumatic brain injury emphasizes that there is no such thing as a typical brain injury and that each child's recovery is unique. It stresses the schools' responsibility to serve these children's educational, psychological, emotional, communicative, and/or health needs, and urges public agencies to work collaboratively to provide appropriate services. Information about traumatic brain injury is provided in a question and answer format, including: diagnostic procedures, major causes, brain conditions qualifying and not qualifying under the federal definition of traumatic brain injury, prevalence in Arizona, prognosis, rehabilitation techniques, eligibility for special education services, and classroom interventions. A list of 21 community-based resources in Arizona concludes the guide. Contains 17 references. (JDD)

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AZ-TAS

Themes & Issues

A Series of Topical Papers on Special Education

Traumatic Brain Injury

EC 303835

Arizona Department of Education

Special Education

Arizona Department of Education
C. Diane Bishop, State Superintendent of Public Instruction
September 1993

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TRAUMATIC BRAIN INJURY

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DEFINITION:

Traumatic brain injury means an injury to the brain caused by an external physical force resulting in total or partial functional disability or psychosocial impairment, or both, that adversely affects educational performance. The term applies to open or closed head injuries resulting in impairments in one or more areas, such as cognition; language; memory; attention; reasoning; abstract thinking; judgment; problem solving; sensory, perceptual and motor abilities; psychosocial behavior; physical functions; information processing; and speech. The term does not apply to brain injuries that are congenital or degenerative, or brain injuries induced by birth trauma.

INTRODUCTION

Every year more than 165,000 children in the United States who have suffered a traumatic brain injury (TBI) will be hospitalized. Many children sustaining traumatic brain injury return to school following hospitalization. For some, there will be little or no educational impact. For others, the educational impact will be significant.

The brain determines who we are, what we do and how we behave. When this crucial organ is injured, the damage can be diffuse, resulting in a constellation of symptoms and multiple impairments affecting many aspects of one's life. There is no such thing as a typical brain injury. Traumatic brain injury is acquired by a person in the course of what may well have been normal development. It occurs suddenly, leaving the person significantly changed after the injury. When traumatic brain injury occurs in childhood or adolescence, different developmental areas are affected. Each child's recovery is unique due to pre-injury personality and learning style, location and severity of the injury, time elapsed since the injury, and the individual's psychological reaction to the injury. A review of the literature reveals that there is an adverse effect on educational adjustment for the majority of children with head injuries. Many of these children require significant instructional modifications, such as special education or an adjusted school program. Even children who reenter a regular classroom often encounter significant adjustment problems, such as grade repetition, learning or behavior problems. The public schools have the responsibility to serve these children who have not only educational, but psychological, emotional, communicative and/or health needs. These students are entitled to appropriate evaluation and educational services. Since the needs of these students are so complex and diverse, it is important that public agencies (schools, community health care and state government) work collaboratively to provide appropriate services.

QUESTIONS AND ANSWERS

1. HOW IS THE DIAGNOSIS MADE?

Traumatic brain injury applies to closed or open (penetrating) head injuries. In closed and open head injury, there is both primary (direct damage to the brain as a result of physical impact) and the possibility of secondary damage (damage due to bleeding, infection and swelling which occurs after the blow to the head). Seizure disorders are not uncommon following head injury and may affect educational performance.

No single individual or assessment tool can be used to provide a complete diagnosis of traumatic brain injury. The methods of diagnosis of traumatic brain injury include an assessment of the structural damage and the neuropsychological function (i.e., brain behavior relationship). Neurologic diagnostic procedures to assess structural damage to the brain include, but are not limited to, neurological examination, x-ray of the skull, Magnetic Resonance Imaging (MRI) and Computerized Tomography (CT scan). It is extremely important to understand that an x-ray of the brain tells us nothing about the student's ability to function in the school setting. To fully understand the impact of the injury, a comprehensive, multidisciplinary evaluation which may include neuropsychological assessment should be conducted. Neuropsychological assessment[1] assists in determining the status of brain behavior/brain function to provide information about the individual's strengths and needs. A holistic picture of an individual is important to provide an accurate diagnosis.

The terms "mild," "moderate" and "severe" are used to clinically describe head injury. "Mild" head injuries are generally characterized by brief (a few minutes) or no loss of consciousness. Sports injuries, minor car accidents, falls and blows to the head belong to this category. Generally, neurological examinations and diagnostic procedures are normal and it is assumed that there was no permanent or structural damage to the brain. These individuals may be treated and released from the emergency room or may require overnight hospitalization. However, this does not mean that there has not been damage to the brain sufficient enough to seriously interfere with functioning. As these individuals try to return to school, they may encounter significant temporary difficulties for some time and find they are unable to maintain their pre-injury performance level. "Mild" head injury does not necessarily translate into mild disability. These individuals often exhibit a general impairment of their ability to effectively perform normal social and academic functions. Somatic symptoms (headaches, dizziness, blurred vision, fatigue, hearing problems), cognitive deficits (short-term memory, confusion, disorientation, delayed/slowed thinking, information processing, distractibility, memory and attention problems), emotional symptoms (irritability, agitation, depression), psychosocial dysfunction (impatience, thoughtlessness), and secondary psychosocial symptoms (anxiety, fear, frustration) can all occur following a "mild" head injury.

Clinical neuropsychology is that specialty which combines the study of clinical psychology and aspects of clinical neurology in order to evaluate, define and remediate the cognitive/behavioral consequences of brain disorders.

"Moderate" head injuries are characterized by a more extended period of unconsciousness. The person is in a coma, which can last from fifteen minutes to 24 hours. These patients are all hospitalized, generally in the acute stages. They may be transferred to a rehabilitation hospital, depending on the extent of their physical and cognitive impairments. Some degree of cognitive impairment is observable.

"Severe" head injuries are marked by periods of coma that last for 24 hours or longer, and individuals may have more extensive physical impairments as a result of the brain damage. They may also have slower, more extended courses of recovery. These individuals often have sustained significant permanent damage.

2. WHAT ARE THE MAJOR CAUSES?

Thousands of preschool and school-age children suffer from traumatic brain injuries each year. The major causes of these injuries are

accidental dropping	pedestrian related accidents
assault/violence	physical abuse
bicycle related accidents	recreational equipment
falls	sports injuries
gunshot/firearms	motor vehicular crashes

Examples of Brain Conditions Qualifying under the Federal TBI Definition

Closed or Open Head Injury:

- Caused by external force
- Secondary damage as a result of the injury

Examples of Brain Conditions Not Qualifying under the Federal TBI Definition

Brain Neoplasms:

Neoplasm-any new and abnormal growth; specifically a new growth of tissue if the growth is uncontrolled and progressive. Also called a tumor.

Infectious Disorders:

- Brain Abscesses
- Meningitis
- Viral Encephalitis

Congenital Disorders:

- Cerebral Palsy
- Hydrocephalus
- Myelomeningocele

Cerebral Vascular Diseases (CVAs) (Strokes):

- Cerebral Embolism and Thrombosis
- Cerebral Hemorrhage
- Subarachnoid Hemorrhage
- Aneurysmal, Arteriovenous malformation, idiopathic (cause not known)

Miscellaneous Conditions:

Toxic, Anoxic and Hypoxic Encephalopathies

- Asphyxiation/choking
- Drugs
- Glue sniffing
- Metal poisonings
- Toxins

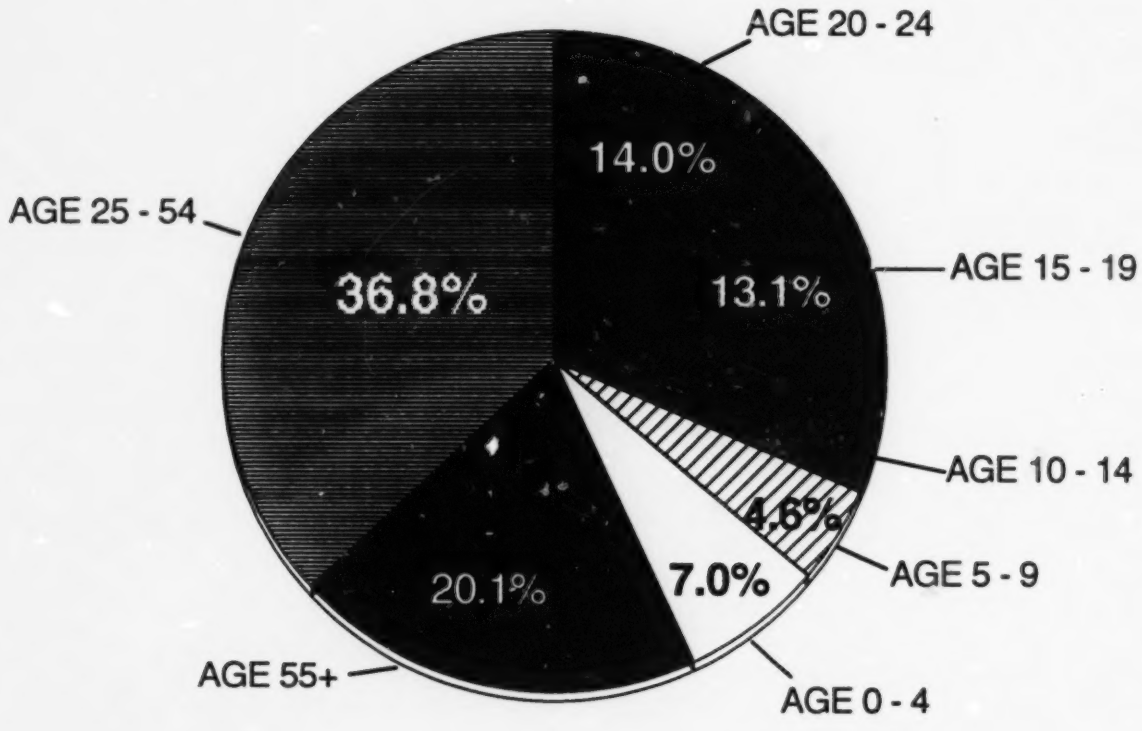
Degenerative Disorders:

- Alzheimer's disease
- Amyotrophic Lateral Sclerosis
- Huntington's Chorea
- Multiple Sclerosis
- Navajo Neuropathy
- Parkinson's disease

3. WHAT IS THE PREVALENCE IN ARIZONA?

In 1990 Arizona's total population was 3,665,228. According to a special study of head-injured patients conducted through the Office of Chronic Disease Epidemiology, Arizona Department of Health Services (ADHS), in 1990, 5,113 (slightly less than 1.4/1,000 population) Arizonans were admitted to acute care hospitals for head injuries. Children zero through four years old accounted for 7 percent of the admissions; children five through nine years old accounted for 4.6 percent; children 10-14 years old for 4.4 percent; teenagers (15-19 years old), 13.1 percent; young adults ages 20-24, 14 percent; and 25-54 years old, 36.8 percent.

PERCENT ADMITTED TO HOSPITALS FOR HEAD INJURIES
BY AGE GROUP



THESE FIGURES ARE ONLY FOR INJURIES CAUSED BY EXTERNAL FORCE. THESE FIGURES DO NOT INCLUDE E.R. ADMISSIONS.

4. WHAT IS THE PROGNOSIS?

Frequently, the term "recovery" after head injury is misleading. Most people's experience regarding illness and injury is one of temporary reduction in functioning followed by a gradual return to normalcy. The continual expectation of a return to normalcy can lead to denial, frustration, disappointment and extremely unrealistic expectations by the individual with a head injury, his/her family, school personnel, friends and others.

Following head injury, it may be more realistic to think in terms of "improvement." Improvement needs to be considered in terms of structural damage to the brain that occurs over the initial one year period. Improvement in cognition, behavior and in functional gains can continue to occur over a longer period of time. Following head injury, each student displays a unique pattern of improvement that is often variable and unpredictable, characterized by major gains often interspersed with periods of apparently little change.

Following head injury, the residual deficits can be grouped into four primary areas: physical, cognitive, executive (planning, organizing and following through with a task) and psychosocial.

Physical deficits can range from severe to nonexistent, and are related to the damage to the brain (neurological) rather than permanent damage to the peripheral parts of the body. Damage to the motor area of the brain may result in ataxia, tremors, hemiparesis or spasticity which may lead to further injury.

Cognitive deficits following head injury may include problems with arousal, attention/concentration, learning, memory, abstraction, conceptualization and/or problem solving. Following head injury, the child may demonstrate severe impairments in registering (input), storing (processing) and retrieving information (output). Learning and memory may decrease sharply following head injury, especially when material becomes more complex. Problems may also occur when information must be recalled after longer periods of time, applied in situations of high anxiety or in situations that differ slightly from those in which the new material, skill or behavior was learned (decreased ability to transfer and generalize skills). Residual deficits in higher-level cognitive skills (abstract reasoning, conceptualization and problem solving) will appear, especially those in which unexpected or unfamiliar circumstances arise. These deficits may be manifested in the following ways: the person is unable to profit from experience; cannot abstract or conceptualize the essence or principle from the concrete details of the situation; may fail to generalize appropriately when a new situation arises; miss the point of what is being said or fail to infer the meaning assumed; may fail to grasp instinctively the implication of an event or conversation, making problem solving difficult; and may fail to think things through.

Complicating this aspect of head injury is that a child may be in a critical stage of cognitive learning at the time of the injury. The effects of the head injury may interfere with his/her ability to develop higher-level thinking abilities beyond the stage of development at the time of injury.

Executive function deficits are manifested in many different ways. The abilities to modulate, monitor, evaluate, regulate and self-correct ongoing behavior are frequently impaired. The child may be unable to evaluate his/her own strengths and weaknesses realistically or to carry out organized, well-monitored, goal-directed activities successfully. The student may give the impression of competence even though unable to plan and/or execute tasks. The student with a head injury can mistakenly be seen as unmotivated and unconcerned; however what may be called "unmotivated" in an intact person may be an organically based inability to plan, put into action and carry through with an appropriate course of action. When this behavior is understood as a primary deficit resulting from traumatic brain injury, then an appropriate individualized education program (IEP) can be developed and implemented. Another manifestation of executive deficits following head injury is that often the most basic, essential ideas simply do not occur to the person with a head injury. That automatic process has broken down for many individuals.

Psychosocial deficits reinforce the truth of the statement, "Life after head injury is never the same." The behavior and personalities of students with head injuries may be dramatically different following the injury. The student with a head injury may not accurately perceive social cues, and inappropriate behavior may result in alienation of others. These changes may produce feelings of anxiety and confusion in parents and teachers, complicating home and school management. Educational management of these behaviors and changes may be quite challenging for teachers. Traditional behavior management approaches may be less successful with students with head injuries if cognitive and social perceptual deficits are not taken into account. It is critical to recognize the complex interplay between neuropsychological deficits and environmental demands, particularly with regard to how these may mitigate or exacerbate personality and behavior problems. For example, the child may say and do things, to the embarrassment of others, that they would not have done prior to the injury. Students with head injuries may be irritable and impatient, and have difficulty controlling strong emotions. Usually, their outbursts are not personal in intent. Inappropriate sexual behavior (disinhibition, altered sex drive, impulsivity) may be a consequence of the head injury. If present, appropriate interventions need to be developed by the IEP team in consultation with qualified professionals.

5. WHAT WORKS?

The unique expression of learning and behavioral deficits resulting from head injury causes an adverse effect on educational performance that is unlike that seen in the established special education categories. Failure is most likely in educational situations which continually demand efficient function of the abilities that are disrupted by brain injury.

General considerations to meet the diverse needs of the child with head injury returning to academic life will be discussed first.

A. Communication: Ongoing, consistent communication between the family, treatment facility or medical/clinical personnel, the student and appropriate school personnel should be established as close to the time after injury as possible to begin discharge planning. If possible, an individual within the school system should be established as a primary contact with those involved outside the school system to secure updated information on

the status of the child and to begin to plan for eventual return to the academic setting. The ideal would be the establishment of a case management system that addresses the issues involved in school reintegration following head injury to meet the unique and individual needs of the child.

B. Integrated Approach: To meet the diverse needs of the student following head injury, an integrated, multidisciplinary team approach is the most effective approach. An approach that focuses only on specific deficits and neglects the general characteristics of impairment is likely to be inadequate. From an instructional standpoint, a cognitive processing model that is based on the premise of brain behavior relationships is needed to meet the student's educational needs. Human behavior always requires input of information to the brain, processing by the brain and output/response. The cognitive processing model emphasizes the three levels of central processing. The first level requires attention, concentration and memory for the input/registering of information and integration of this new material with past experiences; the second level requires language and visual spatial/perceptual skills to process the information; and the third level requires higher level processing skills (i.e., abstract reasoning, decision making, judgment) to process more complex and difficult information and benefit from experiences in a meaningful, logical and organized manner. Following head injury, the child may generally be unable to benefit from a traditional academic approach which focuses only on content rather than process. With information from the multidisciplinary comprehensive evaluation, an appropriate educational program that focuses on process rather than content can be developed by the IEP team to determine special education and related services.

Services that may be needed to adequately serve the student with a traumatic head injury are

a. speech and language services
b. occupational therapy
c. physical therapy
d. counseling--child and family
e. transition planning

C. Awareness and Understanding of Head Injury: Following head injury, the child may struggle with having to understand and adjust to functioning with a "different brain." The child may no longer function in the same way as he/she did prior to the injury. There may be a need to redefine personal goals and aspirations in light of the new circumstances imposed by the head injury. Prior to injury, most children with head injuries follow a typical developmental course of growth and achievement. A normal course of development has now been interrupted in which new learning may be affected. Adjustment to the ongoing changes following the head injury represents a difficult challenge for educators, families and students alike.

6. WHAT IS THE CURRENT STATUS OF TBI IN LAW AND REGULATION?

Section 602 (a)(1) of P.L. 101-476, Individuals with Disabilities Education Act (I.D.E.A.), now designates "traumatic brain injury" as a separate disability category in the definition of "children with disabilities."

The federal definition of TBI in regulation 34 CFR 300.5 (b)(12) applies to children with acquired injuries to the brain caused by an external physical force, resulting in total or partial functional disability or psychosocial impairment, or both, that adversely affects a child's educational performance. The term applies to open or closed head injuries resulting in impairments in one or more areas, such as cognition; language; memory; attention; reasoning; abstract thinking; judgement; problem-solving; sensory, perceptual and motor abilities; psychosocial behavior; physical functions; information processing; and speech. The term does not apply to brain injuries that are congenital or degenerative, or brain injuries induced by birth trauma. TBI is designated as a separate disability category in Arizona state law. A student with a head injury who requires special education may have previously been diagnosed as emotionally disabled, specific learning disabled, mentally retarded, orthopedically impaired or multiply disabled. They have been served in programs all along the continuum of alternative educational placements.

7. WHEN ARE SPECIAL EDUCATION SERVICES APPROPRIATE?

Often the terms "mild," "moderate" and "severe" are used to clinically describe head injury. However, the degree of impairment is not a factor in determining special education eligibility. There are unique individual differences in the constellation, severity, qualitative features and persistence of symptoms among those diagnosed with "mild," "moderate" or "severe" head injury. A student is determined eligible for special education services if 1) the criteria of the federal definition of a student with a traumatic brain injury is met and 2) the multidisciplinary evaluation team determines that the head injury adversely affects a student's educational performance.

If a referral for a special education evaluation is made, the district special education director will arrange for a multidisciplinary evaluation team (MET) to conduct a comprehensive evaluation which includes a medical certification of the TBI impairment and an educational evaluation.

It is critical that schools assist students with head injuries by (1) evaluating and determining whether they need regular or special classroom instruction, (2) helping them attain the greatest possible degree of independence, (3) facilitating the establishment of positive social relationships and (4) monitoring progress and changes in the student's needs over time and the effectiveness of the IEP.

Additional information may be gathered by assessments in the following areas: (1) cognitive and information processing abilities, (2) behavior/emotional status, (3) adaptive behavior, (4) speech and language abilities, (5) fine and gross motor skills, (6) academic functioning

and (7) neuropsychological function (the school district should request a copy of the neuropsychological evaluation from the health care provider and/or parents, if one is available).

Traditional psychological and academic testing may not accurately reflect the child's ability and may overestimate his/her ability to function in the classroom. It is extremely important to note how students with head injuries process information and get to the answer - not just to see whether they know the answers. Often this testing does not detect difficulties in attention, learning and general self-regulatory ability which will be major factors in the child's performance. Factors associated with the administration of tests of cognitive and academic ability (e.g., structured environment, one-to-one interaction) may overestimate the child's ability by masking characteristic problems in the following areas: attention/concentration, task orientation/flexibility, initiation/inhibition, processing efficiency (speed, amount), endurance, persistence, long-term retention of new information, responses to stress, and ability to generalize. Without proper diagnostic testing and special educational planning, the child can be placed in a learning environment that can be discouraging and counterproductive to his/her recovery.

Observation of the student's overall performance throughout the testing period can demonstrate examples of unorganized or fragmented thinking or expression; delayed processing; overload related to visual, verbal, lengthy and/or complex material; and inflexibility connected with changing tasks and/or responses. This information is an important part of the assessment and will be valuable when developing the educational program.

Different evaluation procedures yield different information. Normally, test material is used to predict performance. Because of the variations in performance following head injury, one cannot assume that levels of functioning will remain consistent in different contexts. To assess the quality and consistency of performance over time, the student should be observed in formal testing situations, in informal assessment sessions, in busy classrooms and when prescriptive teaching is used. Reports describing pretraumatic behaviors help the examiner and teacher to recognize similarities between previous and current functioning, target newly acquired behaviors and establish realistic goals.

Basic academic functions, such as reading and spelling, may not immediately be affected by head injury depending on the development stage of the child at the time of the injury. However, difficulties with attention, concentration, memory, motor speed and behavioral control diminish the child's capacity to perform. The younger child who has not previously acquired reading skills may have difficulty learning to read. Problems may only become apparent years after injury as they reflect the cumulative influence of the child's subtle learning difficulties or as new demands are placed on the child that require the integration of damaged systems.

If the student is found eligible for special education, the IEP team, including parent(s), will develop an IEP and determine the least restrictive environment (LRE) in which the IEP can be appropriately implemented. While all IEPs must be reviewed annually, the IEP team may need to be reconvened more often to adjust IEP goals, objectives and, possibly, the LRE. As with any student placed in a special education program, the IEP team must address the extent to which the student will be able to participate with typical peers in academic, nonacademic and extracurricular activities. It is necessary for educators to be sensitive, flexible and supportive,

and to work collaboratively with the parents and health care provider(s) to meet the unique needs of these students.

Educational placement decisions must be based on the individual needs of each child. The educational, cognitive, physical, social and sensory (visual, hearing) needs of the child with a head injury can be extremely diverse. Communication with the health care professional team can help facilitate the transition into school reentry. The school staff should know the student's status upon discharge from the hospital in the following areas: medical, self-care, communication, physical limitations, neurological status, behavior patterns, cognitive recovery and continuing rehabilitation needs. The Arizona State Board of Education's Special Education regulations should be followed in all cases when evaluating and serving any student with disabilities. For a child whose difficulties do not result in the need for special education, instructional or behavioral interventions may be required within the school's regular education program for the child to succeed educationally. The assurance that such accommodation will occur is provided under Section 504 of the Rehabilitation Act of 1973.

8. HOW IS SECTION 504 INVOLVED?

Section 504 of the Rehabilitation Act of 1973 is a broad, federal civil rights/ antidiscrimination law which protects the rights of all eligible individuals with disabilities in federally funded programs and activities.

According to Section 504, "A person with a disability means any person who has a physical or mental impairment which substantially limits one or more major life activities, has a record of such an impairment or is regarded as having such an impairment." Furthermore, recipients of federal funds that operate public elementary or secondary education programs are required to provide a free, appropriate public education (FAPE) to each eligible student with a disability in the recipient's jurisdiction.

If an individual with a TBI is not eligible for special education and related services under the Individuals with Disabilities Education Act (I.D.E.A.), it is probable that the individual may qualify as disabled under Section 504 and would be entitled to all of the protection provided under Section 504. (Refer to the Section 504 AZ TAS document.)

9. WHAT ARE SOME SUGGESTIONS FOR CLASSROOM INTERVENTION?

As discussed in the previous section, the most effective strategies for working with the student with a head injury are a multidisciplinary team approach, a comprehensive assessment that identifies the student's strengths and weaknesses, and use of the cognitive model for learning.

DESIGNING INTERVENTIONS

When designing intervention strategies for the student, the following are important points to consider:

- Good information can be obtained regarding how the student is learning, executing and remembering tasks through observation of the student in social, learning and testing situations by school personnel and parents. The student should be observed to see how he/she approaches and performs the task/activity. The final outcome of the task is not as important as knowing how the student arrived at that point.

- Existing teaching materials, resources and methods may continue to be appropriate but may need to be modified by providing more structure to the task and/or allowing for greater flexibility for task completion. Accommodation may be indicated based on physical, visual, auditory and/or communication deficits.

- It is likely that the student will not be functioning at the same developmental level as he/she was prior to the injury. He/she may be at different developmental learning stages within each of the academic areas. Developmental teaching materials may be appropriate as a starting point to assist in determining the student's current level of performance and to assist the student to relearn material. Whenever possible, it is important to modify the material so that it is age-appropriate and reflects the student's current cognitive and language level.

- All intervention strategies should start a task or activity at the most basic, simple level, gradually increasing in complexity, stopping at the student's discomfort or frustration level. Teachers need to look at how to simplify material, then gradually increase the complexity as the student's ability and confidence improve.

DESCRIPTION OF LEVEL OF PERFORMANCE

Items to consider when describing the student's present level of performance include

- ability to perform within the first level of cognitive processing skills (attention, concentration and short-term memory) which affect input/registering information;

- ability to perform within the intermediate level of central cognitive processing skills of expressive and receptive language (listening, reading, speaking, writing) and/or visual-spatial/visual-perceptual, non-verbal problem solving (i.e., sequencing, planning, organizing) which affect information processing; and

- ability to perform within the highest level of central cognitive processing skills (abstraction, reasoning, concept formation, logical analysis, thought flexibility, simultaneous processing) which affect information processing for appropriate response/behavior.

Deficits in any of the above areas impact performance and may manifest in

> decreased information processing speed; low frustration threshold; decreased auditory, visual and/or tactile processing ability; information overload capacity; decreased ability to initiate or self-start; inappropriate social behaviors; and inability to carryover newly learned material.

INTERVENTION TECHNIQUES

Here are some specific examples of intervention techniques related to possible combinations of some of the above deficits.

> Deficits - receptive language, planning ability, visual-spatial and visual-perceptual skills, information overload, auditory processing
>
> **Intervention** - At least initially, limit the number of times the student changes classrooms and teachers; maintain a consistent routine for the student; monitor the amount of environmental stimulation (auditory and visual distraction); keep materials in the same place; post specific, simple instructions for routine tasks; maintain a structured situation for the student throughout the day. Emphasize written instructions or lists of assignments, a written step-by-step breakdown of instructions for academic tasks, written copy of daily schedule (i.e., with designated time periods, room assignments, name of teacher, name of textbook, other materials needed and seat assignment). These instructions should be simple in language structure (e.g., subject, verb, object) and one to two sentences for each instruction. Instructions should be few in number per page with large spaces between each so that the page does not become too "busy" spatially/visually. An in-depth cognitive and language/linguistic analysis will reveal where the student is functioning. Material should be presented at this level for comprehension and new learning to occur.

As the student successfully masters these simple beginnings, gradually increase the complexity, stopping at the student's discomfort or frustration level.

To further address the visual-spatial, visual-perceptual deficits, the teacher could consider using computer games with mazes and other similar concepts, pattern blocks and auditory tapes; providing maps or pictures for spatial orientation; providing information regarding landmarks that the student may use to get to where he/she is going; and having the student request information and scan for landmarks within the environment that may be unfamiliar. The level of the selected material needs to reflect where the student is functioning cognitively and represent the language/linguistic level as well.

Supplemental activities may include sequencing activities (e.g., teaching the student to use a checklist of sequences to emphasize where he/she is in relation to completing an activity), activities to teach time management skills, and some video materials that require sequencing, planning and other skills. For strengthening auditory processing, the teacher could incorporate auditory training tapes to assist in further assessing the deficit and to assist in training.

Deficits - verbal memory, thought organization, attention, rate of processing information, expressive language

Intervention - The same intervention strategies described above regarding structure, beginning with the simple then gradually moving to the complex, would be appropriate for these areas. Other strategies include computer programs or video games that require a gradually increased attention span to complete the activity; auditory training tapes; limiting the amount of information the student is required to attend to initially; and computer and video materials that focus on visual scanning, eye/hand coordination, speed and processing.

An individualized notebook can be used frequently throughout the school day to aid the student's decreased memory and decreased ability to organize thinking; the teacher may need to highlight sections in the individualized notebook and/or in the text. Certain sections of instructions for assignments and/or tests may also need to be highlighted. The student can be taught to use a daily log, journal or tape recorder to keep track of the sequence of the events of the day, or taught to reconstruct either previous or subsequent events from a given point in time.

For assignments, construct a timeline or study guide to maintain the appropriate sequence of events. The teacher may need to outline specific key points that the student needs to look for. Supplemental, modified or alternative texts for course information may be needed. Extended time should be allowed for assignments, projects and test taking. For book reports, allow the student to use "Books on Tape" or adapted reading material. For variety, board games such as Scrabble and some card games will enhance skills training.

Due to brain injury, the organization of thought patterns to answer questions may be extremely difficult. When a student asks a question, cue him/her to find the answer in his/her material (e.g., cue what section of their notebook to use). Allow more time for the student to answer the question. Alert the student to a change in topics to allow him/her to switch internally.

As the student demonstrates improvement in these skill areas, the level of teacher intervention will gradually decrease.

Deficits - visual-spatial skills, reading and writing skills, flexibility in thinking, abstract/conceptual thinking, ability to initiate or self-start, simultaneous processing, social interaction skills

Intervention - The same interventions for structuring the environment and beginning with the simple then moving to the complex would apply as well as those interventions that allow for flexibility in task performance. In addition, board games such as Clue, Outburst and Struggle are effective as intervention strategies. Card games and computer and video material that require flexibility in thinking are appropriate. Role playing and age-appropriate social skills training would be indicated. These activities may focus initially on cause/effect relationships and hypothetical situations of "what would you do if..." During role playing and social skills training, provide feedback to the student regarding his response/behavior.

Other materials could include critical thinking skills exercises, deductive reasoning skill activities (e.g., puzzles), Tangram or pattern block puzzle design for non-verbal problem solving skills.

Deficits - Impatient, quickly irritated, verbal outbursts, aggression, decreased ability to attend to task, impulsive

Interventions - In planning behavioral interventions for verbal or physical aggressing, it would be important to consider that flashes of irritability often occur when the student is trying to perform a task that is difficult for him/her now but used to be easy. The student becomes frustrated and may strike out at someone or become verbally abusive since his/her ability to inhibit these impulses is disrupted. These outbursts generally last a few minutes or seconds, are usually not purposeful but are a reflex reaction that is forgotten quickly and generally not directed at the person who is struck or insulted.

A skillfully developed behavioral plan should identify areas of difficulty for the student and then delineate steps for intervention, taking into account the student's level of cognitive functioning. Use of a Behavior Observation Log can be implemented to record data that will provide information on patterns of behavior. This information will be useful for staff when planning strategies for intervention and measuring their effectiveness. "Observable descriptions" of behavior problems should include the target problem as well as what preceded the behavior (antecedents).

Decreased stimulation in the classroom and redirecting the student can help diffuse behavior problems. Removing the student from the classroom during or *immediately* after the occurrence of the target problem behavior may be indicated and is often the most effective technique. Removal from the situation should not be construed as punishment so much as an opportunity for the individual to regain control before reentering the situation with another opportunity to succeed. Minimal verbal intervention, eye contact, emotional reaction or other forms of positive or negative attention is recommended during this procedure.

Based on the student's cognitive abilities, teaching behavior controls could be an instructional objective. They could include: "When you feel like this, (name) , do this (name) ." Identification of cause and effect will be an important component of the behavioral plan.

10. WHAT ARE SOME SOURCES OF FURTHER INFORMATION FOR TEACHERS?

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Organizations

National Head Injury Foundation, Incorporated, is an organization of survivors, their families, and professionals, providing advocacy and resource services. It serves as a resource center for printed, audiotaped and videotaped educational materials, and sponsors major research conferences nationally and regional education seminars.

National Head Injury Foundation
1140 Connecticut Avenue, N.W.
Suite 812
Washington, D.C. 20036
(202) 296-6443

Medical Information Resources

You may have questions about the needs of children with head injuries returning to your school and wish more comprehensive information about these children. As you work with the family to secure this information, the following are sources of help:

1. Most acute rehabilitation programs offer follow-up clinics. You may direct families back to the rehabilitation facility, the hospital or the physician that cared for the child at the time of the head injury.

2. You may direct the family back to the children's primary care provider and supply that physician with the specific questions raised within the school, so that he or she can address these questions in the examination or make referrals to appropriate specialists.

11. WHAT ARE SOME COMMUNITY-BASED RESOURCES FOR PARENTS AND TEACHERS?

1. Arizona Center for Law in the Public Interest
   3724 North 3rd Street
   Phoenix, AZ 85012
   Telephone: 252-4904
   Contact Person: Sarah Allen

2. Arizona Department of Economic Security
   Rehabilitation Services Administration
   1430 East Indian School, Suite 100
   Phoenix, AZ 85014
   Telephone: 255-5641
   Contact Person: Suzanne Degroot

3. Arizona Department of Economic Security
   Division of Developmental Disabilities
   1717 West Jefferson
   Phoenix, AZ 85007
   Telephone: 542-5577
   Contact Person: Dr. Diane Renne

4. Arizona Department of Education
Special Education Section
1535 West Jefferson
Phoenix, AZ 85007
Telephone: 542-3183
Contact Persons: Dr. Kathryn Lund
Dr. Julia Williams

5. Arizona Department of Health Services
Office of Chronic Disease Epidemiology
Office of Disability Prevention
1400 West Washington Street
Phoenix, AZ. 85007
Telephone: 542-7333 and 542-7340
Contact Persons: Dr. Timothy Flood
Ann Tarpy

6. Arizona Head Injury Foundation--Tucson
1131 North Winstel Boulevard #A
Tucson, AZ 85716
Telephone: 326-2872
Contact Person: Annette Zaccari

7. Bridges
St. Joseph's/Carondelet
350 North Wilmot Road
Tucson, AZ 85711
Telephone: 721-3856
Contact Person: Rhoda Skokel

8. Community Rehabilitation Services
11000 North Scottsdale Road
Scottsdale, AZ 85254
Telephone: 483-8508
Contact Person: Jane Yakel

9. Good Samaritan Medical Center
1111 East McDowell Road
Phoenix, AZ 85012
Telephone: 239-4528
Contact Persons: Linda Choukalas
Billie Wherley

10. Information and Referral
Phoenix: 263-8856
Tucson: 881-1794 or 1-800-352-3474

11. J.C. Lincoln/Bryans Extended Care Center
9155 North 3rd Street
Phoenix, AZ 85020
Telephone: 944-1666
Contact Person: David Gardiner

12. Meridian Point Rehabilitation Hospital
11250 North 92nd Street
Scottsdale, AZ 85260
Telephone: 860-0671
Contact Person: Jill Goldstein

13. NeuroCare
7227 N. 16th Street, Suite A170
Phoenix, AZ 85020
Telephone: 820-2231
Contact Person: Irwin Altman

14. Phoenix Children's Hospital
1111 East McDowell Road
Phoenix, AZ 85006
Telephone: 239-5920 or 239-2400
Contact Person: Dr. David Woodrich

15. Pilot Parent Partnerships
2150 East Highland, Suite 105
Phoenix, AZ 85016
Telephone: 468-3001
Contact Person: Mary Slaughter

16. Public School Districts of Residence
Contact Person: Special Education Director

17. Rehab Institute of Tucson
2650 North Wyatt
Tucson, AZ 85712
Telephone: 325-1300
Contact Person: Betty Scira

18. Rehabilitation Services for Maricopa County Medical Services
2516 East University Drive
Phoenix, AZ 85034
Telephone: 681-8762
Contact Person: Dr. Philip Barry

19. Scottsdale Memorial Hospital
7400 East Osborn Road
Scottsdale, AZ 85251
Telephone: 481-4948
Contact Person: Connie Novak

20. St. Joseph's Hospital--Barrow Neurological Institute
350 West Thomas Road
Phoenix, AZ 85013
Telephone: 285-3551
Contact Person: Dr. Volker Sontag

21. Valley of the Sun Rehabilitation Hospital
13460 North 67th Avenue
Glendale, AZ 85304
Telephone: 878-8800
Contact Person: Mary Jo Griffin